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Performance Oriented Packaging Testing of Container, Shipping and Storage, CNU-434/E and CNU-435/E for Packing Group II Solid Hazardous Materials

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6. AUTHOR(S)

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13. ABSTRACT (Maximum 200 words)

Qualification tests were performed to determine whether the in-service CNU-434/E Shipping and Storage Container could be utilized to contain properly dunnaged solid type hazardous materials weighing up to a gross weight of 345 kg (760 pounds). The tests were conducted in accordance with Performance Oriented Packaging (POP) requirements specified by the United Nations Recommendations on the Transportation of Dangerous Goods and the Department of Transportation's Title 49 CFR 107. The container has conformed to the POP performance requirements; i.e., the container successfully retained its contents throughout the specified tests.

In addition, due to their similarities in size and weight, this test is considered representative of qualification testing for the CNU-435/E Shipping and Storage Container as per the variation in Title 49 CFR 107, Sec. 178.601h.

14. SUBJECT TERMS

POP Test of CNU-434/E and CNU-435/E Shipping and Storage Containers

15. NUMBER OF PAGES

6

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
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PERFORMANCE ORIENTED PACKAGING TESTING OF CONTAINER, SHIPPING AND STORAGE, CNU-434/E AND CNU-435/E FOR PACKING GROUP II SOLID HAZARDOUS MATERIALS

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31 October 1991

FINAL

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Sponsoring Organization:
Commander, Naval Air Support Center (AIR-41822B)
Department of the Navy
Washington, DC 20361-8050

INTRODUCTION

The CNU-434/E Shipping and Storage Container tested, contained a load of four sand-filled dummy shapes weighing 345 kg (760 pounds). Overall weight of the container was 627 kg (1,381 pounds). This Performance Oriented Packaging (POP) test was performed to ascertain whether this standard container (Packing Group II) would meet the requirements as specified by the United Nations Recommendation on the Transportation of Dangerous Goods Document, ST/SG/AC.10/1, Revision 6, Chapters 4 and 9 and Title 49 CFR 107 dated 1 October 1991. A base level vibration test was also conducted in accordance with the final rulings specified in the Department of Transportation's Performance Oriented Packaging Standards. Due to unavailability and the high cost of the containers, the number of containers used was less than the number required by the regulations. This has been approved by the Under Secretary of Defense, Memorandum for the Joint Logistics Commanders dated 22 February 1990.

In addition, due to their similarities in size and weight, this test is considered representative of qualification testing for the CNU-435/E Shipping and Storage Container as per the variation in Title 49 CFR 107, Sec. 178.601h.

TESTS PERFORMED

1. Base Level Vibration Test

This test was performed in accordance with Title 49 CFR 107, Part 178, Subpart M, Sec. 178.608. One sample container was placed on the repetitive shock platform. The container was restrained during vibration in all but the vertical direction. The frequency of the platform was increased until the container left the platform 1/16 of an inch at some instant during each cycle. Test time was 1 hour at a frequency of 3.8 Hz.

2. Stacking Test

This test was performed in accordance with Title 49 CFR 107, Part 178, Subpart M, Sec. 178.606. One container was used for this test. The container was subjected to a force applied to its top surface equivalent to the total weight of identical packages stacked to a height of 3 meters (including the test sample). A weight of 3,138.6 kg (6,905 pounds) was stacked on the sample container. The test was performed for 24 hours. After the allowed time, the weight was removed and the container examined.

3. Drop Test

This test was performed in accordance with Title 49 CFR 107, Part 178, Subpart M, Sec. 178.603. One container was used throughout the test. Five drops were performed from a height of 1.2 meters (4 feet), impacting the following surfaces:

a. Flat bottom

b. Flat top

c. Flat on long side

d. Flat on short side

e. One corner

All tests were performed at an ambient temperature of +70 ± 20 °F.

PASS/FAIL

1. Base Level Vibration Test

The criteria for passing the base level vibration test is outlined in Title 49 CFR 107, Sec. 178.608(c): "A packaging passes the vibration test if there is no rupture or leakage from any of the packages."

2. Stacking Test

The criteria for passing the stacking test is outlined in Title 49 CFR 107, Sec. 178.606(d): "No test sample may leak. In composite packagings or combination packagings, there must be no leakage of the filling substance from the inner receptacle, or inner packaging. No test sample may show any deterioration which could adversely affect transportation safety or any distortion likely to reduce its strength or cause instability in stacks of packages."

3. Drop Test

The criteria for passing the drop test is outlined in Title 49 CFR 107, Sec. 178.603(f): A package is considered to successfully pass the drop tests if for each sample tested--

(1) For removable head drums for solids, the entire contents are retained by an inner packaging (e.g., a plastic bag) even if the closure on the top head of the drum is no longer sift-proof;

(2) For a composite or combination packaging, there is no damage to the outer packaging likely to adversely affect safety during transport, and there is no leakage of the filling substance from the inner packaging;

(3) For a drum, jerrican or bag, any discharge from a closure is slight and ceases immediately after impact with no further leakage;

(4) For packagings for explosives, no rupture of the packaging occurs.

TEST RESULTS

1. Base Level Vibration Test

Satisfactory.

2. Stacking Test

Satisfactory.

3. Drop Test

Satisfactory.

DISCUSSION

1. Base Level Vibration Test

Immediately after the vibration test was completed, the container was removed from the platform, turned on its side and observed for any evidence of leakage. There was no leakage to the container as a result of this test.

2. Stacking Test

The container was visibly checked after the 24-hour period was over. There was no leakage, distortion, or deterioration to the container as a result of this test.

3. Drop Test

After each drop, the container was inspected for any damage which would be a cause for rejection. Final inspection indicated damage was minimal with only minor denting noted. The container remained intact and functional upon completion of the tests.

REFERENCE MATERIAL

A. United Nation's "Recommendation on the Transportation of Dangerous Goods," ST/SG/AC.10/1, Revision 6

B. Title 49 CFR 107, et al., Performance Oriented Packaging Standard; Changes to Classification, Hazard Communication, Packaging and Handling Requirements Based on UN Standards and Agency Initiative.

C. Bureau of Explosives Tariff No. BOE 6000K Hazardous Materials Regulations of the Department of Transportation by Air, Rail, Highway, Water including Specifications for Shipping Containers.

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TEST DATA SHEET

DATA SHEET:	
Container: CNU-434/E and CNU-435/E Shipping and Storage Container	
Type: 4B1	**Container P/N or NSN:** NSN 8E 8140-01-268-2872
Specification Number:	**Material:** Aluminum
Gross Weight: 627 kg (1,381 pounds)	**Dimensions:** 133.880" L x 36.000" W x 19.680" H
Closure (Method/Type): Over-center swing bolt latches	**Tare Weight:** 282 kg (621 pounds)
Additional Description:	
PRODUCT:	
Name: See table	**NSN(s):** See table
United Nations Number: See table	
United Nations Packing Group: II	
Physical State (Solid, Liquid, or Gas): Solid	
Vapor Pressure (Liquids Only): N/A	**At 50 °C:** N/A **At 55 °C:** N/A
Consistency/Viscosity: N/A	**Density/Specific Gravity:** N/A
Amount Per Container:	**Flash Point:** N/A
Net Weight: See table	
TEST PRODUCT:	
Name:	**Physical State:**
Consistency: N/A	
Density/Specific Gravity: N/A	
Test Pressure (Liquids Only): N/A	
Amount Per Container: N/A	**Net Weight:** 345 kg (760 pounds)

TABLE 1
CNU-434/E and CNU-435/E Shipping and Storage Container

NALC	NSN	Type	Packing Drawing	UN Code	UN Number	#/ Cntr	Weight (lb)
PC06	1410-01-197-8996	AGM-122A	1596AS06	1.1E	0181	4	230
PV40	1410-01-305-8889	CATM-122A	1596AS06	1.1D	0276	4	230
1W12	1410-01-201-4011	Missile Training	1596AS06	--	--	4	190

CNU-434/E AND CNU-435/E SHIPPING AND STORAGE CONTAINER

POP MARKING

UN 4B1/Y627/S/**/USA/DOD/NAD

** YEAR LAST PACKED OR MANUFACTURED

Encl (2)